

Title: Changes to the Soybean Nuclear Proteome During Rust Resistance

Author: Bret Cooper, Soybean Genomics and Improvement Lab

Abstract:

Approximately 4,975 proteins from nuclear preparations of soybean leaves were detected using a high-throughput liquid chromatography-mass spectrometry method. Statistics of summed spectral counts revealed sets of proteins with differential accumulation changes between isogenic soybeans susceptible and resistant to the soybean rust fungus. These protein accumulation changes were compared to previously reported gene expression changes and very little overlap was found. Many of these proteins have predicted nuclear localization signals, have homology to transcription factors and other nuclear regulatory proteins, and are phosphorylated. These results suggest that numerous plant proteins are post-translationally affected in the nucleus after infection. It is possible that some of these proteomic changes influence defense responses that ultimately confer resistance to soybean rust. This is the first indication of large-scale proteomic change in the nucleus of any plant after infection. In addition, a new concept, termed proteogenetics, is introduced whereby proteomics information is used to complement DNA marker information to map a genetic trait.